

TEACHING RESOURCES

THE THREE C'S OF LEARNING: CLASSROOM, COLLABORATION, AND COMMUNICATION

IMPROVED STUDENT SUCCESS AND ENGAGEMENT THROUGH PEER INSTRUCTION: AN OPINION PIECE

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THE INSPIRATION

What is peer instruction? According to Mazur et al (2009),

“Peer Instruction is an instructional strategy for engaging students during class through a structured questioning process that involves every student.”

Mazur et al. noticed that students were not engaged in the learning during lectures.¹ The application of peer instruction involved breaking up the classic university lecture with three or four Concept Tests, consisting of multiple choice questions focused on core concepts. These were multiple choice questions that were conceptual in nature. In small groups of three or four, they discuss the answers and tried to come to a consensus. Though this definition applies to my classroom it does so in a limited fashion – I have my own spin of peer instruction. I use letters (A to E for multiple choice questions or T F for true false questions) printed on cardstock. The question is displayed so that the students can see it clearly. The students are given a few minutes to read the question and then asked to hold up their answer cards.

APPLYING PEER INSTRUCTION

To adapt this to peer instruction, the students need to be prepared and comfortable with selecting an incorrect response. I have to be careful handling certain situations. Occasionally, a majority of the class will select the ‘best’ answer and therefore, isolating a few students that selected incorrectly. Before indicating the best response, it is important to discuss the merits of the answers that the few students selected. However, most often, the responses are spread across all answer options. This spread provides the optimal opportunity for real learning. Therefore, it is critical that adequate time and effort is placed in developing the questions and answers. This incites a productive discussion where students try to convince others of the merits of their response.

These conversations allow students to articulate their reasoning, convince each other, and understand the nuances of the concepts being applied – this benefits all students irrespective of which answer they chose. I give the class up to five minutes to discuss their responses. Most days, my students work together to solve problems using whiteboards (2ft by 2ft). Occasionally, I will need to add a few comments based on any misconceptions that I overheard during the discussions. Often consensus is not reached after one round of discussions. The ideal situation is when the class becomes split into two groups, for example they chose response A or C. At this point I will announce “A”s convince “C”s and “C”s convince “A”s. This helps promote a progressive reasoning through the question and answers. This tactic usually this leads to consensus. If consensus is not reached, I will discuss the merits of the next best answer before explaining why a particular response is best. As the teacher, this helps me understand concepts that I need go over again and re-explain. Applying peer instruction in my classroom allows students to actively learn and gives me instant feedback.

Many years ago, I would go through a sample problem and then have them work together on their homework problems. Now, I give them the problems (usually two or three) to solve as I walk around the classroom listening to their discussions. Once they are successful on the first they move onto the next and so on. Alternatively, I split the

class into groups. Then, group one is given problem one, group two is given problem two and group three is given problem three. The other three groups are also given the same three problems. After solving the problem, the two groups with the same problem get together and discuss how they will present their solutions to the class. The activity ends with the three groups presenting their solutions.

For more advanced learning, I also use peer instruction through a cooperative group problem solving and inquiry-based activities. These follow a plan developed by Chris Meyer² in which students are given a real inquiry-based problem to solve. For example, I tell my grade twelve students that I will be placing a mass on a scale that is resting on an incline. Each group must come up with a clearly laid out plan for solving the problem as well as a thorough explanation of how and why it will work. The day of the evaluation I will tell each group the angle of the incline and the mass that they will be using and they must predict what the scale will read within two minutes of receiving the information.

IMPACT ON STUDENTS

Peer instruction takes several other forms in my classroom. For it to be effective the students have to “buy into it” early in the semester. To ensure that everyone works together, I do two things. When the students arrive on the first day they will find large tent

cards, also made of cardstock, that have their names at their desks. This helps students who are new or shy and do not know where to sit. I explain to the students that this is not to help me learn their names (it makes it harder). The next day when they arrive they will find their cards in a different location. I do this for two weeks to ensure that each student works with all of the students in the class. On the very first class, I always have them do a twenty-minute long “ice breaker” activity which requires that they work together and communicate with each other. I have found that, using these techniques, my students’ conceptual understanding is greatly improved and they are much more engaged in the learning process. There is a place for this teaching model to be used in a variety of settings within the STEM framework and at all levels of education.

REFERENCES

1. Peer Instruction: Engaging Students One-on-One, All At Once: Authors Catherine H. Crouch, Jessica Watkins, Adam O. Fagen and Eric Mazur. Stylus Publishing, Sterling, VA, 2009
2. <http://www.meyercreations.com/physics/resources.html> retrieved June 20th 2016